AMENDMENTS TO THE CLAIMS:

Please cancel claims 1-5, 16-18, and 23, without prejudice or disclaimer of their subject matter, amend claims 6-15, 19-22, 24, and 25, as indicated below. This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-5. (Canceled)

6. (Currently Amended) A light source apparatus ~~written in claim 5,~~ comprising:

a light source by which a light flux whose emitting angle is different in a horizontal direction and in a vertical direction is projected, and

a beam shaping element, for converting the light flux into a light flux whose emitting angle is almost equal and projecting, of a single lens formed of plastic in which a linear expansion coefficient α_n satisfies the following expression (1)

$5.0 \times 10^{-5} < \alpha_n < 8.0 \times 10^{-5}$ (1), and

a part of the beam shaping element is fixed and arranged to the light source, so that an astigmatism generated following the refractive index change of the beam shaping element generated by the temperature change is suppressed by an interval change, which is generated by the linear expansion of the beam shaping element, between the light source and the incident surface of the beam shaping element,

wherein, in the beam shaping element, an outgoing surface is fixed so that the distance in the optical axis direction to the light source is almost constant in the range of change of the environmental temperature,

wherein the beam shaping element is structured so that the astigmatism generated by the temperature change is suppressed by using the astigmatism generated following the shape change due to the temperature change of the beam shaping element,

wherein a fixing member for fixing the beam shaping element outgoing surface is formed of a material whose linear expansion coefficient satisfies $1.0 \times 10^{-5} < \alpha n < 3.0 \times 10^{-5}$,

wherein, in the beam shaping element, a cross sectional shape in the horizontal direction or in the vertical direction of the at least one optical surface of the incident surface and the outgoing surface is non-circular arc,

wherein the surface shape of the beam shaping element incident surface satisfies the following Math-1 or Math-2[[.]],

[Math-1]

$$(Z - R_x)^2 + X^2 = \left(R_x - \frac{Y^2}{R_y\left(1 + \sqrt{1 - (1 + k_y)Y^2 / R_y^{\,2}}\right)} + \sum\nolimits_i A_{yi} Y^i \right)^2$$

[Math-2]

$$(Z - R_y)^2 + Y^2 = \left(R_y - \frac{X^2}{R_x\left(1 + \sqrt{1 - (1 + k_x)X^2 / R_x^{\,2}}\right)} + \sum A_{xi} X^i \right)$$

[[H]]hereupon, Z is a distance in the optical axis direction (Z-axis direction) (an advancing direction of the light is positive), X, Y are distances in X-axis direction (horizontal direction), Y-axis direction (vertical direction)(height from the optical axis), R_x is a paraxial radius of curvature on XZ surface, R_y is a paraxial radius of curvature on YZ surface, k_x,k_y, A_{xi} and A_{yi} are non-circular arc coefficients.

7. (Currently Amended) A light source apparatus ~~written in~~ of claim 6,

wherein the surface shape of the beam shaping element outgoing surface satisfies the following Math-3 or Math-4[[.]]:

[Math-3]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{\left(1+\sqrt{1-Y^2/R_y{}^2}\right)}\right)$$

[Math-4]

$$(Z-R_y)^2+Y^2=\left(R_y-\frac{X^2}{\left(1+\sqrt{1-X^2/R_x{}^2}\right)}\right).$$

8. (Currently Amended) A light source apparatus ~~written in claim 1,~~ comprising:

a light source by which a light flux whose emitting angle is different in a horizontal direction and in a vertical direction is projected, and

a beam shaping element, for converting the light flux into a light flux whose emitting angle is almost equal and projecting, of a single lens formed of plastic in which a linear expansion coefficient α_n satisfies the following expression (1)

$5.0 \times 10^{-5} < \alpha_n < 8.0 \times 10^{-5}$ (1), and

a part of the beam shaping element is fixed and arranged to the light source, so that an astigmatism generated following the refractive index change of the beam shaping element generated by the temperature change is suppressed by an interval change, which is generated by the linear expansion of the beam shaping element, between the light source and the incident surface of the beam shaping element,

wherein the surface shape of the beam shaping element outgoing surface satisfies the following Math-1 or Math-2[[.]]:

[Math-1]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{R_y\left(1+\sqrt{1-(1+k_y)Y^2/R_y{}^2}\right)}+\sum_i A_{yi}Y^i\right)^2$$

[Math-2]

$$(Z-R_y)^2+Y^2=\left(R_y-\frac{X^2}{R_x\left(1+\sqrt{1-(1+k_x)X^2/R_x{}^2}\right)}+\sum A_{xi}X^i\right)$$

[[H]]hereupon, Z is a distance in the optical axis direction (Z-axis direction) (an advancing direction of the light is positive), X, Y are distances in X-axis direction (horizontal direction), Y-axis direction (vertical direction)(height from the optical axis), R_x is a paraxial radius of curvature on XZ surface, R_y is a paraxial radius of curvature on YZ surface, k_x, k_y, A_{xi} and A_{yi} are non-circular arc coefficients.

9. (Currently Amended) A light source apparatus ~~written in~~ of claim 8,

wherein the surface shape of the beam shaping element incident surface satisfies the following Math-3 or Math-4[[.]]:

[Math-3]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{\left(1+\sqrt{1-Y^2/R_y{}^2}\right)}\right)$$

[Math-4]

$$(Z - R_y)^2 + Y^2 = \left(R_y - \frac{X^2}{\left(1 + \sqrt{1 - X^2 / R_x^2}\right)} \right)^2.$$

10. (Currently Amended) An optical pick-up apparatus ~~which characterized in that~~ comprising: ~~it is provided with a~~

the light source apparatus ~~written in~~ of claim 7, and

a light converging element for converging the light flux on ~~the~~ an information recording surface of ~~the~~ an optical information recording medium, and the reproducing and/or recording of the information is conducted on the optical information recording medium.

11. (Currently Amended) An optical pick-up apparatus ~~written in~~ of claim 10, ~~wherein it has~~ further comprising:

a divergent angle converting element for converting the divergent angle of the light flux projected from the beam shaping element outgoing surface, ~~and it~~

wherein the optical pick-up apparatus is structured so as to satisfy the following relational expression[[.]],

$0.5 < (L/S) \times fc < 1.0$

[[H]]hereupon,

L: thickness on axis (mm) of the beam shaping element,

S: distance (mm) on the optical axis between light source and the beam shaping element incident surface,

fc: focal distance (mm) of the divergent angle converting element.

12. (Currently Amended) An optical pick-up apparatus ~~written in~~ of claim 11,

wherein the divergent angle converting element is a coupling lens for converting the light flux projected from the beam shaping element into a parallel light parallel to the optical axis.

13. (Currently Amended) An optical pick-up apparatus ~~which characterized in that~~ comprising: ~~it is provided with a~~

the light source apparatus ~~written in~~ of claim 9 and a light converging element for converging the light flux on ~~the~~ an information recording surface of ~~the~~ an optical information recording medium, and the reproducing and/or recording of the information is conducted on the optical information recording medium.

14. (Currently Amended) An optical pick-up apparatus ~~written in~~ of claim 13, ~~wherein it has~~ further comprising:

a divergent angle converting element for converting the divergent angle of the light flux projected from the beam shaping element outgoing surface, ~~and it~~

wherein the optical pick-up apparatus is structured so as to satisfy the following relational expression[[.]],

$1.5 > (L/S) \times fc > 1.0$

[[H]]hereupon,

L: thickness on axis (mm) of the beam shaping element,

S: distance (mm) on the optical axis between light source and the beam shaping element incident surface,

fc: focal distance (mm) of the divergent angle converting element.

15. (Currently Amended) An optical pick-up apparatus ~~written in~~ of claim 14,

wherein the divergent angle converting element is a coupling lens for converting the light flux projected from the beam shaping element into a parallel light parallel to the optical axis.

16-18. (Canceled)

19. (Currently Amended) A light source apparatus ~~written in claim 18,~~ comprising:

a light source by which a light flux whose emitting angle is different in a horizontal direction and in a vertical direction is projected, and

a beam shaping element, for converting the light flux into a light flux whose emitting angle is almost equal and projecting, of a single lens formed of plastic in which a linear expansion coefficient α_n satisfies the following expression (1)

$5.0 \times 10^{-5} < \alpha_n < 8.0 \times 10^{-5}$ (1), and

a part of the beam shaping element is fixed and arranged to the light source, so that an astigmatism generated following the refractive index change of the beam shaping element generated by the temperature change is suppressed by an interval change, which is generated by the linear expansion of the beam shaping element, between the light source and the incident surface of the beam shaping element,

wherein, in the beam shaping element, a cross sectional shape in the horizontal direction or in the vertical direction of the at least one optical surface of the incident surface and the outgoing surface is non-circular arc,

wherein the surface shape of the beam shaping element incident surface satisfies the following Math-1 or Math-2[[.]],

[Math-1]

$$(Z - R_x)^2 + X^2 = \left(R_x - \frac{Y^2}{R_y\left(1 + \sqrt{1 - (1 + k_y)Y^2 / R_y^2}\right)} + \sum_i A_{yi} Y^i \right)^2$$

[Math-2]

$$(Z - R_y)^2 + Y^2 = \left(R_y - \frac{X^2}{R_x\left(1 + \sqrt{1 - (1 + k_x)X^2 / R_x^2}\right)} + \sum A_{xi} X^i \right)$$

[[H]]hereupon, Z is a distance in the optical axis direction (Z-axis direction) (an advancing direction of the light is positive), X, Y are distances in X-axis direction (horizontal direction), Y-axis direction (vertical direction)(height from the optical axis), R_x is a paraxial radius of curvature on XZ surface, R_y is a paraxial radius of curvature on YZ surface, k_x, k_y, A_{xi} and A_{yi} are non-circular arc coefficients.

20. (Currently Amended) A light source apparatus ~~written in~~ of claim 19,

wherein the surface shape of the beam shaping element outgoing surface satisfies the following Math-3 or Math-4[[.]],

[Math-3]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{\left(1+\sqrt{1-Y^2/R_y{}^2}\right)}\right)$$

[Math-4]

$$(Z-R_y)^2+Y^2=\left(R_y-\frac{X^2}{\left(1+\sqrt{1-X^2/R_x{}^2}\right)}\right)\cancel{.}$$

21. (Currently Amended) A light source apparatus ~~written in claim 18,~~ comprising:

a light source by which a light flux whose emitting angle is different in a horizontal direction and in a vertical direction is projected, and

a beam shaping element, for converting the light flux into a light flux whose emitting angle is almost equal and projecting, of a single lens formed of plastic in which a linear expansion coefficient α_n satisfies the following expression (1)

$5.0 \times 10^{-5} < \alpha_n < 8.0 \times 10^{-5}$ (1), and

a part of the beam shaping element is fixed and arranged to the light source, so that an astigmatism generated following the refractive index change of the beam shaping element generated by the temperature change is suppressed by an interval change, which is generated by the linear expansion of the beam shaping element, between the light source and the incident surface of the beam shaping element,

wherein, in the beam shaping element, a cross sectional shape in the horizontal direction or in the vertical direction of the at least one optical surface of the incident surface and the outgoing surface is non-circular arc,

wherein the surface shape of the beam shaping element outgoing surface satisfies the following Math-1 or Math-2[[.]]:

[Math-1]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{R_y\left(1+\sqrt{1-(1+k_y)Y^2/R_y^{\ 2}}\right)}+\sum_i A_{yi}Y^i\right)^2$$

[Math-2]

$$(Z-R_y)^2+Y^2=\left(R_y-\frac{X^2}{R_x\left(1+\sqrt{1-(1+k_x)X^2/R_x^{\ 2}}\right)}+\sum A_{xi}X^i\right)$$

[[H]]<u>h</u>ereupon, Z is a distance in the optical axis direction (Z-axis direction) (an advancing direction of the light is positive), X, Y are distances in X-direction direction (horizontal direction), Y-direction (vertical direction) (height from the optical axis), R_x is a paraxial radius of curvature on XZ surface, R_y is a paraxial radius of curvature on YZ surface, k_x, k_y, A_{xi} and A_{yi} are non-circular arc coefficients.

22. (Currently Amended) A light source apparatus ~~written in~~ <u>of</u> claim 21,

wherein the surface shape of the beam shaping element incident surface satisfies the following Math-3 or Math-4[[.]]:

[Math-3]

$$(Z-R_x)^2+X^2=\left(R_x-\frac{Y^2}{\left(1+\sqrt{1-Y^2/R_y^{\ 2}}\right)}\right)$$

[Math-4]

$$(Z - R_y)^2 + Y^2 = \left(R_y - \frac{X^2}{\left(1 + \sqrt{1 - X^2 / R_x^2}\right)} \right)^2.$$

23. (Canceled)

24. (Currently Amended) An optical pick-up apparatus ~~written in claim 23,~~ ~~wherein it has~~ comprising:

a light source apparatus comprising:

a light source by which a light flux whose emitting angle is different in a horizontal direction and in a vertical direction is projected, and

a beam shaping element, for converting the light flux into a light flux whose emitting angle is almost equal and projecting, of a single lens formed of plastic in which a linear expansion coefficient α_n satisfies the following expression (1)

$5.0 \times 10^{-5} < \alpha_n < 8.0 \times 10^{-5}$ (1), and

a part of the beam shaping element is fixed and arranged to the light source, so that an astigmatism generated following the refractive index change of the beam shaping element generated by the temperature change is suppressed by an interval change, which is generated by the linear expansion of the beam shaping element, between the light source and the incident surface of the beam shaping element,

and

a light converging element for converging the light flux on an information recording surface of an optical information recording medium, and the reproducing and/or recording of the information is conducted on the optical information recording medium,

and further comprising:

a divergent angle converting element for converting the divergent angle of the light flux projected from the beam shaping element outgoing surface, ~~and it~~

wherein the optical pick-up apparatus is structured so as to satisfy the following relational expression[[.]],

$$3.5 > (L/S) \times fc > 1.0$$

[[H]]hereupon,

L: thickness on axis (mm) of the beam shaping element,

S: distance (mm) on the optical axis between the light source and the beam shaping element incident surface,

fc: focal distance (mm) of the divergent angle converting element.

25. (Currently Amended) An optical pick-up apparatus ~~written in~~ of claim 24,

wherein the divergent angle converting element is a coupling lens for converting the light flux projected from the beam shaping element into a parallel light parallel to the optical axis.